

# Radio Frequency Micro Ion Thruster for Precision Propulsion, Phase II

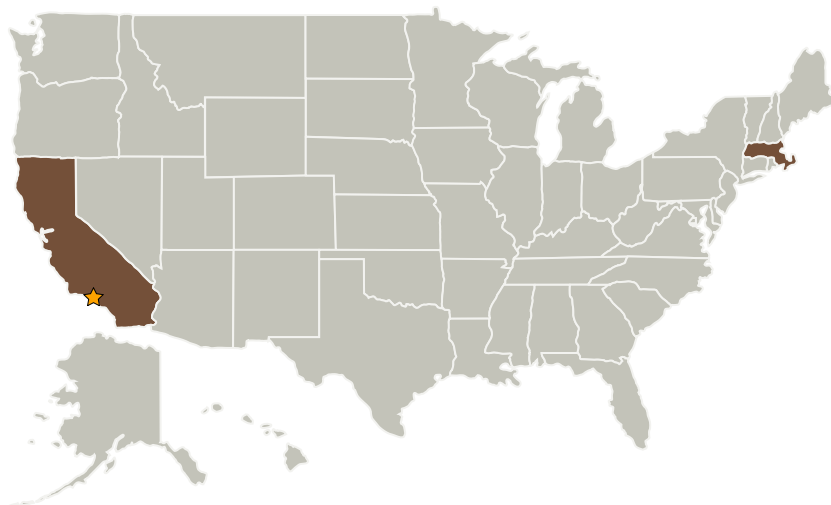
Completed Technology Project (2005 - 2007)



## Project Introduction

Busek proposes to continue development of an engineering model radio frequency discharge, gridded micro ion thruster that produces sub-mN to mN thrust precisely adjustable over a wide dynamic thrust range. Phase I testing proved the feasibility of the concept and estimated performance was exceptional. Measuring beam current and voltage, a thrust up to 1.6mN, thrust efficiencies up to 40% and propellant utilization up to 80% were estimated. Specific impulse ranged from 500-3000seconds. Beam power maximum was 38 watts and the rf power at this maximum was about 30watts total and approximately 20 watts rf deposited into the plasma. The rf discharge ionizer eliminated any need for an internal cathode. In Phase II, Busek will measure thrust directly, characterize the thruster over a wide range of operating conditions and predict lifetime. MIT will advance a numerical simulation of the rf thruster to be used for scaling and design purposes. For missions with cryogenic sensors, a thruster utilizing non-condensable propellant(s) will be evaluated. In addition, a beam neutralizer will be investigated. An rf cathode or carbon nanotube field emission cathode are the two most promising neutralizers.

## Primary U.S. Work Locations and Key Partners



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## Organizational Responsibility

### Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

### Lead Center / Facility:

Jet Propulsion Laboratory (JPL)

### Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★ Jet Propulsion Laboratory(JPL)	Lead Organization	NASA Center	Pasadena, California
Busek Company, Inc.	Supporting Organization	Industry Women-Owned Small Business (WOSB)	Natick, Massachusetts

## Primary U.S. Work Locations

California	Massachusetts
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## Project Management

## Program Director:

Jason L Kessler

## Program Manager:

Carlos Torrez

## Technology Areas

## Primary:

- TX01 Propulsion Systems
  - └ TX01.2 Electric Space Propulsion
    - └ TX01.2.3 Electromagnetic